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By Fax  
Confirmation by Mail

International Preliminary Examining Authority  
European Patent Office  
Directorate General 2  
D-80298 München  
Germany

Clamart, October 15<sup>th</sup>, 2004.

International Patent Application no. **PCT/EP03/50263**  
Applicants: **Services Pétroliers Schlumberger et al.**  
Our Ref: **WO 21.1087**

Dear Sirs:

I refer to the written opinion of the International Preliminary Examination Authority dated August 20<sup>th</sup>, 2004.

Applicants present herewith a new set of claims that is believed to overcome any rejections against set of claims as filed.

The new set of claims comprises a new independent claim 1 based on claims 1, 4 and 6 as filed. New claim 2 is similar to claim 5 as filed. New claim 3 is similar to claim 2 as filed. Claim 3 as filed has been cancelled. New claims 4 to 14 are similar respectively to claims 7 to 17 as filed.

Document US 4,086,811 neither describes or suggests any predetermined clearance between the bearing blocks and the spindle. In the description of the impeller device according to the invention (page 9 last paragraph to page 10 first paragraph), it is stated that this predetermined clearance enables all impeller devices mounted according to the invention to start their rotation for the same fluid velocity. This technical feature is particularly advantageous since - with a simple construction- it increases significantly consistency between measurements obtained from said impellers.

The new set of claims is thus believed new and inventive in view of the cited prior art.

Yours faithfully,



Hélène RAYBAUD  
European Patent Attorney

Encl.

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

21 JAN 2005

PCT

To:

RAYBAUD, Helene  
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NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

01.12.2004

Applicant's or agent's file reference  
WO 21.1087

IMPORTANT NOTIFICATION

International application No.  
PCT/EP 03/50263

International filing date (day/month/year)  
25.06.2003

Priority date (day/month/year)  
23.07.2002

Applicant  
SERVICES PETROLIERS SCHLUMBERGER et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the International  
preliminary examining authority:



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Rec'd

PATENT COOPERATION TREATY

10/521975



20 JAN 2004

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REC'D 02 DEC 2004

INTERNATIONAL PRELIMINARY EXAMINATION REPORT<sup>PCT</sup>

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WO 21.1087	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/50263	International filing date (day/month/year) 25.06.2003	Priority date (day/month/year) 23.07.2002
International Patent Classification (IPC) or both national classification and IPC G01F1/15		
Applicant SERVICES PETROLIERS SCHLUMBERGER et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 4 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand  17.02.2004	Date of completion of this report  01.12.2004	
Name and mailing address of the International preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer:  Feldhoff, R  Telephone No. +49 89 2399-2186  	

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP 03/50263

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-15 as originally filed

**Claims, Numbers**

1-14 filed with telefax on 18.10.2004

**Drawings, Sheets**

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/EP 03/50263**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	2-13
	No: Claims	1,14
Inventive step (IS)	Yes: Claims	
	No: Claims	1-14
Industrial applicability (IA)	Yes: Claims	1-14
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item V**

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

**Prior Art Documents**

The following document cited in the search report is referred to in this communication:

**D1:** US-A-4 086 811

**Article 33(2) PCT**

Document **D1** discloses an impeller device comprising the features of independent **claim 1** (see e. g. figure 2; col. 1, l. 39-45 and col. 2, l. 42-58): support (4, 4a, 4b, 5, 5a, 5b); spindle having conical ends (13); fixed bearing block (6); movable bearing block (16); conical recesses (14, 15); means for forming a predetermined clearance (18a, 18b). Therefore, the subject-matter of **claim 1** is not new (Art. 33(2) PCT).

In view of the negative opinion vis-à-vis independent **claim 1**, also independent **claim 14** lacks novelty (Art. 33(2) PCT).

**Article 33(3) PCT**

The subject-matter of independent **claim 11** claims a method suitable for assembling an impeller device as the one disclosed in document **D1** (see e. g. figure 2 and col. 2, l. 42-58). Therefore, **D1** is regarded as the closest prior art with respect to **claim 11**.

The impeller assembling method of **claim 11** seems to correspond to a method a person skilled in the art would apply without making use of inventive ingenuity, in particular since the consequences and advantages of the consecutive method steps can be overlooked beforehand. Independent **claim 11** thus does not involve an inventive step (Art. 33(3) and Rule 65 PCT).

**Article 33(3) PCT**

Dependent **claims 2-10, 12 and 13** do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step in the sense of Article 33(3) and Rule 65 PCT since said dependent claims seem to contain merely usual technical measures which an expert in the related technical field would apply without using inventive ability.

**Remark**

The embodiment of figure 4 is not covered by the amended claims.

## Claims

1. Impeller device for data acquisition in a flow, comprising a support (3) to hold a spindle (2) around which the impeller (1) is fitted, wherein:

- the two bearing blocks (4.1, 4.2) are mounted on the support (3) such that one (4.1) of the bearing blocks is fixed and the other (4.2) is free to move with respect to said support;

- the bearing blocks (4.1, 4.2) are made from a material with the lowest possible coefficient of friction and each comprise an approximately conical recess (6) into which one of the ends (5) of the spindle (2) fits;

- the ends of the spindle (2) are approximately conical; and

- said impeller device also comprises means (9) of forming a predetermined clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2).

2. Device according to claim 1, wherein the mobile bearing block (4.2) is crimped in a base (4.3).

3. Device according to claim 1 or 2, wherein the bearing blocks (4.1, 4.2) are made from a material chosen from among alumina, corundum, diamond and sapphire.

4. Device according to any one of claims 1 to 3, wherein the means (9) of forming the predetermined clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2) comprise:

- a stop (11) to be inserted in the support (3),
- means of blocking (12) the stop (11) with respect to the support (3) and,
- a removable shim (10), the thickness of which corresponds to the clearance (j),

the shim (10) being slid into the support (3) between the stop (11) and the mobile bearing (4.2) placed in a position with almost no clearance with the spindle (2),

the shim (10) being removed when the stop (11), forced into contact with the shim (10) is blocked with respect to the support (3), allowing the mobile bearing block (4.2) to occupy another position in which it replaces the shim (10).

5. Device according to claim 4, wherein the stop (11) is a sleeve with a longitudinal slit and the blocking means (12) are a screw that expands the split sleeve radially.

6. Device according to any one of claims 1 to 3, wherein the means of forming the clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2) comprise:

- a stop (32) to be inserted in the support (3), the stop (32) and the mobile bearing block (4.2) being provided with a dog (37) that controls the clearance (j),
- means (39) of blocking the stop (32) with respect to the support (3) when it is forced into contact with the mobile bearing block (4.2) placed in an approximately clearance free position with the spindle (2), without being engaged,
- means (30, 35) of displacing the mobile bearing block (4.2) in another position in which it is engaged and to hold it in the other position.

7. Device according to claim 6, wherein the means for displacing the mobile bearing block (4.2) comprise a rod fixed (30) on the mobile bearing block (4.2) that passes through the stop (32) and that is free to move in rotation and a return spring (35) around the rod (30), pressing on the stop (32) at one end and fixed to the rod (30) at the other end.



8. Device according to any one of claims 1 to 7, wherein the support (3) is in the form of a stirrup.

9. Device according to claim 8, wherein the support (3) is made of Inconel.

10. Device according to any one of claims 1 to 9, wherein it comprises a rotation velocity sensor (8) for the impeller (1) housed in the support (3) and placed in the spindle of the impeller (1).

11. Process for installation of an impeller (1) on a support (3) for data acquisition in a flow, wherein it comprises the following steps:

fixing a fixed bearing block (4.1) on the support (3),

positioning a mobile bearing block (4.2) in a first position on the support (3), the mobile bearing block (4.2) being sufficiently far from the fixed bearing block (4.1) to put the spindle (2) of the impeller (1) between them, the bearing blocks (4.1, 4.2) each comprising an approximately conical recess (6),

placement of the spindle (2) of the impeller (1), this spindle (2) being provided with approximately conical end pieces (5), each of them fitting in a recess (6),

positioning of the mobile bearing block (4.2) in a second position, in a clearance free stop in contact with the spindle (2),

solidarisation of a stop (11, 32) with respect to the support (3), this stop (11, 32) will cooperate with the mobile bearing block (4.2), its position taking account of a predetermined clearance (j) to be formed between the mobile bearing block (4.2) and the spindle (2),

displacement of the mobile bearing block (4.2) to a third position that moves it away from the fixed bearing block (4.1) by the predetermined clearance (j) and which brings it into contact with the stop (11, 32).

12. Process according to claim 11, wherein it comprises a step to insert a shim (10) determining the clearance (j) in the support (3) between the mobile bearing block (4.2) and the stop (11) before the solidarisation step and a step to remove the shim (10) after the solidarisation step but before the displacement step.

13. Process according to claim 11, wherein the displacement step of the mobile bearing block (4.2) includes a step in which the mobile bearing block (4.2) is engaged with the step (32), the dog determining the clearance.

14. Data acquisition instrument in a flow, wherein it comprises at least one device according to one of claims 1 to 10.